Remarks

The above-referenced application has been reviewed in light of the Examiner's Office Action dated January 25, 2005. Claims 1, 7 and 10-11 have been amended. Therefore, Claims 1-21 are currently pending in this application. The Examiner's reconsideration of the rejections in view of the above amendments and the following remarks is respectfully requested.

In accordance with the Office Action, the drawing Figures 8 and 9 each drew an objection for clarity. Replacement drawing sheets having improved clarity are submitted herewith.

In accordance with the Office Action, Claims 1, 7, 10-11, 14, and 17-21 drew objections for informalities. Such informalities (i.e., the abbreviation "CSD") were not found in Claims 14 and 17-21. Claims 1, 7 and 10-11 have been amended in accordance with the Examiner's kind suggestions to correct the informalities.

In accordance with the Office Action, Claims 1-21 stand rejected under 35 U.S.C. § 102(b) as being anticipated by IEEE Publication Number 1080-1820/97 to Pasko et al. entitled "Optimization Method for Broadband Modem FIR Filter Design using Common Subexpression Elimination" (hereinafter "Pasko '97"). This rejection is respectfully traversed.

The Pasko '97 reference is generally directed towards filter design using Common Subexpression Elimination (*see* Pasko '97 at Title). Pasko '97 shows "an exhaustive search method to find multiple common bit patterns in a FIR filter

coefficient array" (*Id.* at p. 100, col. 2, lines 2-4), using a "Canonic Signed Digit (CSD) representation" (*Id.* at p. 100, col. 2, lines 12-13), which Pasko calls "a representation with a minimum number of non-zero bits, and therefore a minimum number of adder-subtractors" (*Id.* at p. 100, col. 2, lines 13-15). However, using the strategy of Pasko '97, this so-called minimum number is only achieved "with probability higher than 0.5" (*Id.* at p. 103, col. 2, lines 40-41). In addition, Pasko's minimum, even when achieved, can be no fewer than the number of original distinct bit patterns in the filter coefficient array, since only the actual multiple common bit patterns may be combined in Pasko's best case.

Pasko '97 sets forth that a "floating point coefficient is converted during quantization to its closest CSD representation according to three criterions: the coefficient wordlength, the maximum number of non-zero bits, and the allowed quantization error. *No other optimization is performed during this step*" (*Id.* at p. 101, col. 2, lines 8-13, *emphasis* added). Pasko further states that recurring bit patterns are "detected by ... an exhaustive search for common n-bit patterns" (*Id.* at p. 102, col. 1, lines 3-8; *see also* p. 102, col. 2, lines 3-4).

Applicant's amended Claim 1 recites, *inter alia,* "A filter coefficient design method ... comprising ... making a code word subexpression ... as a *virtual common subexpression* that is relevant to a predetermined common subexpression so that adders are shared with the common subexpression in tap lines of the random filter coefficients" (*emphasis* added).

Thus, while the "predetermined common subexpression" of Applicant's

amended Claim 1 may combine multiple common bit patterns comparable to those resulting from the searches of Pasko '97, Applicant's *virtual* common subexpression further reduces the number of adders, for example, beyond what was facilitated or even contemplated by Pasko '97. Therefore, the Pasko '97 reference fails to teach or suggest at least "A filter coefficient design method ... comprising ... making a code word subexpression ... as a virtual common subexpression that is relevant to a predetermined common subexpression", as recited, *inter alia,* in Applicant's amended Claim 1.

Similarly, each of amended Claim 7, and Claims 14 and 17-21, recites, *inter alia,* a "virtual common subexpression", and is likewise neither taught nor suggested by the Pasko '97 reference.

Amended Claims 10-11 each recite, *inter alia,* "second shift register members shifting code words of the other filter coefficients that are not defined as the common subexpressions by using the code words of the common subexpressions", and "second composite members for adding the shifted digital samples that are output from the second shift register members to the composite outputs of the common tap lines to provide the results to each of corresponding tap lines". Pasko '97 fails to address "shifting code words of the other filter coefficients that are not defined as the common subexpressions by using the code words of the common subexpressions" and "adding the shifted digital samples that are output from the second shift register members". Therefore, the recitations of amended Claims 10-11 are neither taught nor suggested by Pasko

’97.

Therefore, each of Claims 1, 7, 10-11, 14 and 17-21 is neither taught nor suggested by the Pasko ’97 reference, nor by any of the other references of record in this case.

Conclusion

Accordingly, it is respectfully submitted that amended independent Claims 1, 7 and 10-11, as well as independent Claims 14 and 17-21, are in condition for allowance for at least the reasons stated above. Since the dependent Claims 2-6, 8-9, 12-13 and 15-16 each depend from the above claims and necessarily include the elements and limitations thereof, it is respectfully submitted that these claims are also in condition for allowance for at least the reasons stated, and for reciting additional patentable subject matter.

All issues raised by the Examiner having been addressed, reconsideration of the rejections and an early and favorable allowance of this case are earnestly solicited.

Respectfully Submitted,

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